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**(54) Method and apparatus for manufacturing insoles.**

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## Claims

This invention relates to a method and apparatus for manufacturing insoles with anatomically configurated surfaces corresponding to the bottoms of the user's feet.

Footwear articles, which are currently produced with mass production techniques, are designed to fit an average human foot, such that they can be conveniently utilized by a large number of users.

However, the shape of human feet differ between individuals, and for this reason adaptation plantar insoles are generally employed which are selected by trying their fit with the worn footwear.

The currently available shoe insoles of this type come in a very large variety of designs and in large number, their differences residing in their shapes, thickness, material, and the reference anatomy after which they have been modelled.

Accordingly, the problem of adaptability has been merely mitigated, or rather transferred to another product.

In recent times, so-called self-modelling insoles have been introduced (e.g. comprising a flexible bag filled with water), which on deforming under the body's weight, acquire the contours of the foot sole.

However, their functionality is rather poor, inasmuch as by utilizing the principle of displacing a material from the more heavily loaded areas toward the lightly loaded ones, they cannot always adapt themselves because their operation is only suitable for feet having an exactly determined free volume (plantar arc and space between toes and sole).

From the DE—B—1 234 355 and the US—A—2 082 451 it is already known to impress the configuration of the bottom of a user's foot in a hardenable chemical composition arranged in a pan and covered by a flexible cloth and to remove the foot therefrom when the chemical composition has sufficiently hardened. However, in such cases a plastic mass has to be used as the hardenable chemical composition, which complicates the operation, in view also of the fact that substantial hardening time is required.

The task of this invention is to provide a method which allows insoles to be manufactured in a simple and rapid manner, the shape of which exactly fits the bottom of the foot of its intended user.

In particular the task of this invention is to provide a method of the aforesaid kind, in which a pourable chemical composition may be used.

Within that general aim, it can be arranged that the invention also provides an apparatus of very simple configuration for implementing said method.

It can be further arranged that the method and apparatus according to this invention are quite economical, such that high quality and low

competitive price products can be obtained.

The above tasks are carried out and the problems involved are solved by the invention as defined in the appended claims.

5 The features and advantages of the invention will be more clearly apparent from the following detailed description of the method steps and implementing apparatus provided for the inventive method, said steps and apparatus being illustrated by way of example only in the accompanying drawings, where:

Figure 1 is a perspective view of the dual pan container wherein the insoles are molded;

10 Figure 2 is a sectional view of the assembly involved in the method;

Figure 3 illustrates the step of pouring the reactive composition into the pans;

15 Figure 4 shows the arrangement of the cloth over the reaction area;

Figure 5 illustrates the molding step using the intended wearer's feet as plugs;

20 Figure 6 shows the blanks as withdrawn from the molding pans;

Figure 7 is a plan view of the blanks evidencing the trimming lines for the finishing step thereof; and

25 Figure 8 shows the finished product.

With reference to the drawing figures, in a box-like container 1 of substantially parallel-epipedal shape, preferably molded from a plastics material, there are two pans 2, 3 which are arranged side-by-side and separated by a raised web 4 to the same height as the contour 5 of said box-like container 1. Said pans 2 and 3 have such dimensions as to amply accommodate the user's feet.

30 Along an upper edge indicated at 6, there is provided a hinge 7 which holds a frame 8 securely, the frame 8, in its closed position, overlapping the upper edge of the box-like container 1, to leave the top faces of the pans 2 and 3 open.

35 In the closed position, said frame 8 is held in contact with the upper edge of the container 1, by means of manually operated latches 9.

40 The first step of the method according to this invention consists of preparing parallelepiped strips 10 from a spongeous and optionally fibrous material which is highly deformable under load, and of arranging such elements on the bottom of the two pans; then, a reactive product or composition 12 is prepared in any suitable preparation vessel 11 and poured to impregnate the fibrous material 10 and foam and solidify in a pre-arranged convenient time.

45 After pouring said reactive composition, both pans, 2 and 3, are covered with an elastic or under certain circumstances preferably bi-elastic type of impermeabilized cloth 13, which is held in place by lowering the frame 8.

50 At this time, the intended user puts his/her feet 14 and 15 into the pans, thus deforming the spongeous material 10 which will be molded to an exact impression of the feet.

55 The feet 14 and 15 should be kept fixed in

position until the product 12 has reacted completely, thus producing a block 16 carrying an impression 17 of considerable solidity and in-deformability.

To obtain the finished product 18, that is the insole, the block 16 is cut, at first in a coarse manner along a line like at 19 in Figure 7, thereafter it is trimmed with conventional equipment such as to closely adapt it to the shape of the footwear for which it is intended.

The resulting product is an insole which precisely fits the foot of the person that underwent the molding process, and the supporting of the plantar region of the foot is a uniform one without overpressure or unsupported areas.

The method and apparatus implementing it are extremely simple, involve no excessive equipment and material costs, and its use is well within the capabilities of almost anyone.

The quality level of the resulting product is quite good, and its cost fairly limited.

No problems of excessive metering are encountered because any excess material would simply bulge out the elastic cloth at the foot sides, and after solidification be eliminated with a trimming operation.

It will be appreciated that all of the invention objects are achieved, by providing a simple and practical method of preparing insoles with anatomically contoured surfaces tailored to fit, thus solving a large number of the problems which arise from the different configurations of the feet of each individual.

Obviously, the dimensions and materials may be any ones, as dictated by individual application requirements.

### Claims

1. A method for manufacturing insoles (18) with anatomically configurated surfaces corresponding to the bottoms of the user's feet (14, 15), wherein a pan (2, 3) with a hardenable chemical composition (12) is used on which the user's foot leaves the impression of the configuration of the bottom thereof, after the hardenable composition has sufficiently hardened, characterized in that for each foot the following steps are carried out:

a) arranging on the bottom of a respective one of a pair of juxtaposed pans a pad (10) of a spongy material, said pad being deformable under load;

b) pouring into said respective pan said reactive chemical composition which is effective to impregnate said spongy material and foam within a sufficiently short time;

c) covering said respective pan with an impermeabilized cloth (13) of the elastic type held stretched by a suitable frame (18);

d) positioning the user's foot on said cloth in said respective pan such as to deform both said cloth and said spongy material according to said user's foot configuration;

e) allowing the chemical composition to set

for a sufficient time to retain unaltered the impression thus left in said material and, upon removal of the foot;

f) removing the blank thus obtained and trimming it to just leave the plantar impression (17) and cut the insole to the footwear contour for which the insole is intended.

2. An apparatus for manufacturing insoles (18) with anatomically configurated surfaces corresponding to the bottoms of the user's feet (14, 15), including a pan (2, 3) having a bottom surface and sidewalls (4, 5) extending upwardly from the bottom surface thereby to define a trough-like shape for the pan (2, 3) characterized in that a pair of pan formations (2, 3) are provided which are part of a container (1) in which they are formed by providing one of said sidewalls (4) in an intermediate position between said pan formations (2, 3), said pan formations (2, 3) holding in use a spongy pad (10) on each of said bottom surfaces with an impermeabilized elastic cloth (13) placed on top of said pads (10), said pads (10) being impregnated in use with a foamable reactive chemical composition (12), said sidewalls (4, 5) having a contour zone on the top thereof, hinge means (7) on an edge (6) of said contour zone, a lid-like frame (8) hinged on said hinge means (7) and in closed position mating with said contour zone, and openings in said lid-like frame situated above said pan formations (2, 3) when the lid-like frame (8) is in closed position to allow a user's feet to pass therethrough and reach the cloth over the pads (10) on said bottom surfaces.

3. An apparatus according to claim 2, characterized in that latch means (9) are provided for holding said lid-like frame (8) in its closed position onto said container (1).

### Patentansprüche

1. Verfahren zur Herstellung von Brandsohlen (18) mit anatomisch geformten, den Unterseiten der Füße (14, 15) des Benutzers entsprechenden Oberflächen, wobei eine Pfanne (2, 3) mit einer härtbaren chemischen Masse (12) verwendet wird, auf welcher der Fuß des Benutzers einen Abdruck entsprechend der Form der Unterseite des Fußes nach dem ausreichenden Aushärten der härtbaren Masse hinterläßt, dadurch gekennzeichnet, daß folgende Stufen für jeden Fuß durchgeführt werden:

a) Anordnung eines Polsters (10) aus einem Schwammmaterial auf dem Boden von jeweils einem eines Paares von nebeneinander aufgestellten Schalen, welches Polster unter Belastung verformbar ist;

b) Eingießen der genannten reaktionsfähigen chemischen Masse in die betreffende Pfanne, welche Masse befähigt ist, das Schwammmaterial zu imprägnieren und innerhalb einer ausreichend kurzen Zeit zu schäumen;

c) Abdecken der betreffenden Pfanne mit einem elastischen, undurchlässig gemachten Tuch (13), welches mittels eines geeigneten Rahmens (8) gespannt gehalten wird;

d) Anordnung des Fußes des Benützers auf dem Tuch in der betreffenden Pfanne, derart, daß sowohl das Tuch als auch das Schwammatmaterial entsprechend der Form des Fußes des Benützers verformt werden;

e) Härtenlassen der chemischen Masse während einer Zeit, die ausreicht, den auf diese Weise im genannten Material erzeugten Abdruck nach der Entfernung des Fußes unverändert zu belassen;

f) Entnahme der so erhaltenen Rohstücke und Nachschneiden derselben, so daß gerade der Fußsohlenabdruck (17) übrig bleibt und Zuschneiden der Brandsohle zum Umriß des Schuhwerkes, zu welchem die Brandsohle bestimmt ist.

2. Vorrichtung zur Herstellung von Brandsohlen (18) mit anatomisch geformten, den Unterseiten der Füße (14, 15) des Benützers entsprechenden Oberflächen bestehend aus einer Pfanne (2, 3) mit einer Bodenfläche und von der Bodenfläche nach oben ragenden Seitenwänden (4, 5), um eine trogartige Form für die Pfanne (2, 3) zu bilden, dadurch gekennzeichnet, daß ein Paar von pfannenartigen Gebilden (2, 3) vorgesehen ist, welche einen Teil eines Behälters (1) bilden, in welchem sie ausgebildet werden, indem eine der Seitenwände (4) in einer Zwischenstellung zwischen den pfannenartigen Gebilden (2, 3) vorgesehen wird, wobei die pfannenartigen Gebilde (2, 3) während des Gebrauches auf jeder der Bodenflächen ein Schwammpolster (10) mit einem oberhalb der Polster (10) angeordneten, undurchlässig gemachten, elastischen Tuch (13) halten, wobei die Polster (10) während des Gebrauches mit einer schäumbaren, reaktionsfähigen chemischen Masse (12) getränkt werden und die Seitenwände (4, 5) an ihrem oberen Ende eine Umfangszone und an einer Kante (6) der Umfangszone Scharniereinrichtungen (7) aufweisen, an denen ein deckelartiger Rahmen (8) angelenkt ist, der in geschlossener Stellung an der Umfangszone anliegt, wobei im deckelartigen Rahmen befindliche, oberhalb der pfannenartigen Gebilde (2, 3) bei geschlossenen deckelartigem Rahmen (8) angeordnete Öffnungen es einem Fuß des Benützers gestatten, hindurchzutreten und das oberhalb der Polster (10) auf den Bodenflächen angeordnete Tuch zu erreichen.

3. Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß Schnappeinrichtungen (9) zum Halten des deckelartigen Rahmens (8) in seiner geschlossenen Stellung am Behälter (1) vorgesehen sind.

#### Revendications

1. Un procédé pour la fabrication de semelles intérieures (18) avec des surfaces à configura-

tion anatomique correspondant au-dessous des pieds (14, 15) de l'utilisateur, dans lequel on utilise un bassin (2, 3) avec une composition chimique durcissable (12) sur laquelle le pied de l'utilisateur laisse l'empreinte de la configuration de sa partie inférieure après que la composition durcissable ait durcie suffisamment, caractérisé en ce que, pour chaque pied, les étapes suivantes sont mises en oeuvre:

(a) disposition sur le fond de l'un des deux bassins juxtaposés d'un tampon (10) susceptible de se déformer sous charge et réalisé en un matériau spongieux;

(b) versage dans ledit bassin de ladite composition chimique réactive qui est apte à imprégner ledit matériau spongieux et à mousser en un temps relativement court;

(c) couverture dudit bassin par une toile imperméabilisée (13) présentant des propriétés élastiques et maintenue tendue par un cadre convenable (8);

(d) positionnement du pied de l'utilisateur sur ladite toile dans ledit bassin correspondant, de façon à déformer à la fois ladite toile et ledit matériau spongieux selon la forme dudit pied de l'utilisateur;

(e) application de la composition chimique pendant un temps suffisant pour conserver sans altération l'empreinte laisser dans ledit matériau et après enlèvement du pied;

(f) enlèvement du flanc ainsi obtenu suivi de son ébarbage pour laisser uniquement l'empreinte plantaire (17) et découpe de la semelle intérieure au contour de la chaussure à laquelle elle est destinée.

2. Un appareil pour la fabrication de semelles intérieures (18) avec des surfaces à configuration anatomique correspondant au-dessous des pieds (14, 15) de l'utilisateur, comportant un bassin (2, 3) présentant une surface de fond et des parois latérales (4, 5) s'étendant vers le haut à partir de la surface de fond y relatif pour définir une forme en auge pour le bassin (2, 3), caractérisé en ce que deux formes de bassin (2, 3) sont prévues qui constituent une partie d'un conteneur (1) dans lequel elles sont formées en disposant l'une desdites parois latérales (4) dans une position intermédiaire entre lesdites formes de bassins (2, 3), lesdites formes de bassins (2, 3) supportant en service un tampon spongieux (10) sur chacune desdites surfaces de fond avec une toile imperméabilisée élastique (13) placée au-dessus desdits tampons (10), lesdits tampons (10) étant imprégnés en service d'une composition chimique réactive moussante (12), lesdites parois latérales (4, 5) présentant une zone périphérique à leur partie supérieure, des moyens d'articulation (7) sur le bord de ladite zone périphérique, un cadre en forme de couvercle (8) articulé sur lesdits moyens d'articulation (7) et s'ajustant en position fermée sur ledit cadre en forme de couvercle placées au-dessus desdites formes de bassins (2, 3), lorsque le cadre en

forme de couvercle (8) est en position fermée afin de permettre aux pieds de l'utilisateur de passer à travers et d'atteindre la toile disposée au-dessus des tampons (10) sur lesdites surfaces de fond.

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3. Un appareil selon la revendication 2, caractérisé en ce que des moyens de fermeture (9) sont prévus pour maintenir ledit cadre en forme de couvercle (8) dans sa position de fermeture sur ledit conteneur (1).

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